VI. NATURAL RESOURCES

The Town of Hamilton generally straddles the watershed divide that separates Catoctin and the Goose Creek basins. Outside of the Town limits, the land slopes down into smaller sub-basin drainage areas. As this currently rural land is considered for development, the preservation of natural resources will benefit the Hamilton community. Emphasis should be placed on the following:

- Preserving natural stormwater drainage systems;
- Preserving water quality and quantity;
- Maintaining clean air;
- Maintaining the area's natural beauty, a critical component to community attractiveness, and;
- Limiting residential densities that tax our natural resources.

Geological Features

Geology: The Town of Hamilton and its surrounding area lies in the valley between the Catoctin Ridge and Blue Ridge Mountains. This area is called the Blue Ridge Uplands by geologists. In general, it is underlain by a variety of gneiss and sedimentary rocks of old but uncertain age, with some diabase intrusions. Because of the variety of formations and geologic movements, surface soils derived from this bedrock are complex.

The local geology does not contain rock materials that offer potential for economically viable mining or extraction. While the sedimentary bedrocks have some permeability, gneisses and diabase intrusions only transmit groundwater along fractures, and therefore wells will produce variable quantities of water with varying depths and locations. Because the soils tend to be deep, septic fields usually function well.

Soils: The soils in the area generally are described as the Purcellville-Philomont-Swampoodle Association. These are deep, generally well drained soils which exhibit good potential for agriculture except in areas with seasonal high water tables or other constraints.

Much of the land within the Joint Land Management Area (JLMA) around Hamilton is classified by the US Department of Agriculture as "prime agricultural" soils that are best suited for continuous agricultural use. Hay, feed crops, and edible crops as well as animal husbandry are rural uses well suited to these soils.

A moderate amount of the soils near the Town have a substantial clay content which creates seasonal high water tables or other wetness problems. These soils can be used as farmland although they are not considered as prime soils.

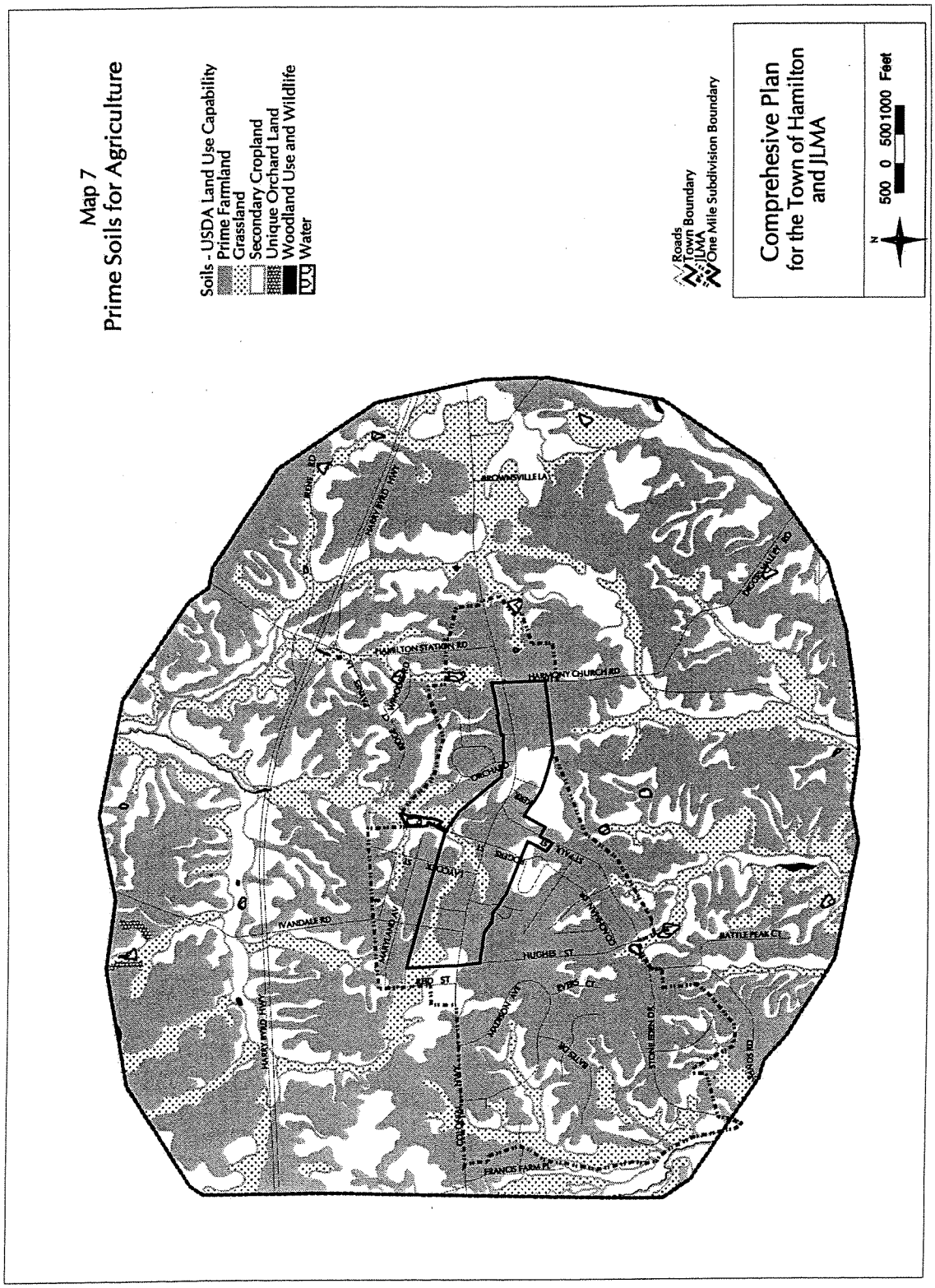
Much of the soil along the sides of drainage ways tend to have shallower rock (three-five feet) and moderately steep slopes of 15% to 25%. Much of the soil located in low-lying areas along streams and swales has severe drainage problems and are typically located in 100-year floodplain areas. Some of these areas, however, have soils that can be engineered to overcome wetness problems resulting in excellent land for many farming activities.

Because of the excellence of the soils, agriculture should be encouraged as a primary use in these areas of fertile land. County administered land preservation programs such as the Property Development Rights (PDR) program, used in tandem with various private land conservation easement programs can help rural land preservation efforts.

Topography: The Hamilton area has gently rolling topography. Steep slopes (over 25% grade) are mostly limited to locations adjacent to the creeks. About 50 acres around the Town have moderately steep slopes (15% to 25% grade). The topography generally falls toward the larger stream systems to both the north and south of the Town.

Development on steep slopes is subject to erosion and sedimentation that causes adverse effects on surface water quality. Stream valley slopes often serve as vegetative buffers to filter stormwater run-off and as wildlife habitats. The policies in this Plan promote the conservation of steep slopes and minimization of disturbance of moderately steep slopes. To that end the Plan supports the application of development standards to prevent these hazards.

Elevations in the Town and JLMA range from about 550 feet above sea level at various points in and around the Town, to 425 feet along a creek bed southwest of Town. The lowest point in the Town is the sewage treatment facility on the north edge of the corporate limits with an elevation of 460 feet.


Map 7
Prime Soils for Agriculture
Soils - USDA Land Use Capability
Prime Farmland
Grassland
Secondary Cropland
Unique Orchard Land
Woodland Use and Wildlife
Water
Roads
Town Boundary
JLMA
One Mile Subdivision Boundary
Comprehesive Plan
for the Town of Hamilton
and JLMA
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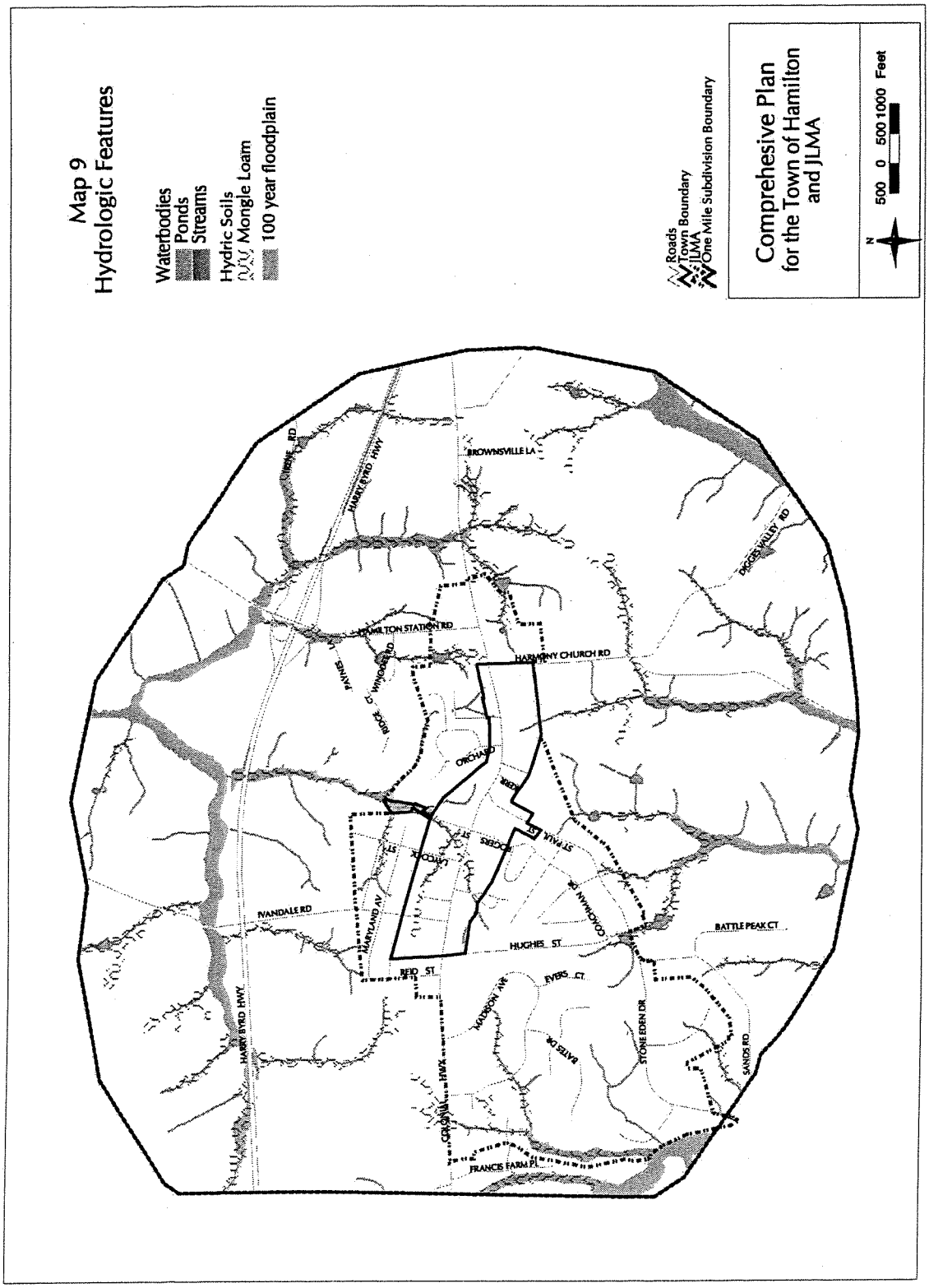
BROWNSVILLE LA
HAMILTON STATION RD
HARMONY CHURCH RD
IVANDALE RD
HUGHES ST
BATTLE PLAIN CT
HARRY BYRD HWY
FRANCIS HAM PL


Map 9
Hydrologic Features
Waterbodies
Ponds
Streams
Hydric Soils
Mongle Loam
100 year floodplain
Roads
Town Boundary
JLMA
One Mile Subdivision Boundary
Comprehesive Plan
for the Town of Hamilton
and JLMA
N
500 0 500 1000 Feet
BROWNSVILLE LA
HARRY BYRD HWY
DIGGS VALLEY RD
HAMILTON STATION RD
HARMONY CHURCH RD
ORCHARD
IVANDALE RD
HUGHES ST
REID ST
BATTLE PEAK CT
EVERS CT
MADISON AVE
STONE EDEN DR
SANDS RD
FRANCIS FARM PL

Hydrological Features

Hydrology: Hamilton and the surrounding JLMA are located in the Catoctin and Goose Creek watersheds. The Town lies mainly in the Catoctin Creek basin with adjacent areas lying in both the Catoctin and Goose Creek basins. Like the Town of Purcellville to the west, Hamilton generally straddles the watershed divide that separates these two major stream systems. There are several smaller, sub-watershed drainage areas that support the tributary creeks that flow through the Town and feed into the South Fork of the Catoctin Creek and the Crooked Run tributary of Goose Creek. Several of the creeks in the Hamilton area have year round flows.

Water Quality and Quantity: The groundwater system in the area surrounding Hamilton is characterized by the fractured gniessic bedrock. Specifically, little is known about the functioning of the groundwater system in and around Hamilton. What is known is generally applicable to fractured bedrock systems as a whole. Localized precipitation that infiltrates overlying soils is the main source of groundwater, which occurs in both the saprolite and bedrock under unconfined conditions. Groundwater movement is greatly restricted by the degree of interconnection between openings in the rock materials, and can be found within the pore spaces between grains (primary porosity/permeability), within fractures in the bedrock, and within small spaces left in the soil mantle by weathering processes (secondary porosity/permeability).

For the most part, bedrock does not have appreciable primary porosity/permeability, and produces water from fractures, joints, and fault zones. Groundwater movement is largely controlled by bedrock lithology and structure, although it generally moves vertically downward by gravity and then laterally toward discharge points (springs) in stream valleys. The groundwater gradient typically mimics topography while following faults, joints, and fractures, with a general flow pattern from higher to lower topography. As a general rule, groundwater is found at greater depths at topographic highs (ridges) than at topographic lows (valleys). Due to the low primary porosity and the high secondary porosity of the bedrock material it is common for wells that penetrate a highly fractured zone to produce water at fairly high rates. The total quantity of groundwater in the bedrock system is limited, however, and is typically very low (on the order of 5-10% of the total volume of the rock). This buffer of "storage" water is rapidly depleted under high extraction and/or low recharge (drought) conditions. This means that under these conditions, it is not uncommon for groundwater to be rapidly transported long distances and for shallow wells to experience significantly reduced production rates or go dry entirely. All this combines to produce a groundwater system that is uniquely susceptible to infiltration of contaminants from surface sources as well as to overproduction from development. Potential contaminant sources include effluent from residential septic systems, underground and above ground fuel storage tanks, fertilizers, and pesticides. Contamination associated with the release of gasoline into the groundwater has been detected in at least one of the wells operated by the Town of Hamilton.

Although groundwater is the most affordable and probable source of drinking water for Hamilton and its vicinity, the possibility of surface water impoundments should be evaluated.

The Town obtains potable water from the five wells owned by the Town. Those residents outside the Town limits who are not served by Town water and sewer obtain their water from individual wells. The Town experiences droughts that require the imposition of water conservation

measures on Town residents and businesses. Development of open space threatens to impact groundwater recharge surface area. Limiting development in critical groundwater recharge areas is necessary to ensure the long-term viability of the water resource.

River and Stream Corridor Resources

Floodplains: With its location at a major watershed divide and with the moderate topographic relief in the vicinity, the Town and its surrounding area have relatively small amounts of land in the 100-year floodplain, which is defined as that area for which there is a 1% chance of flooding in any given year.

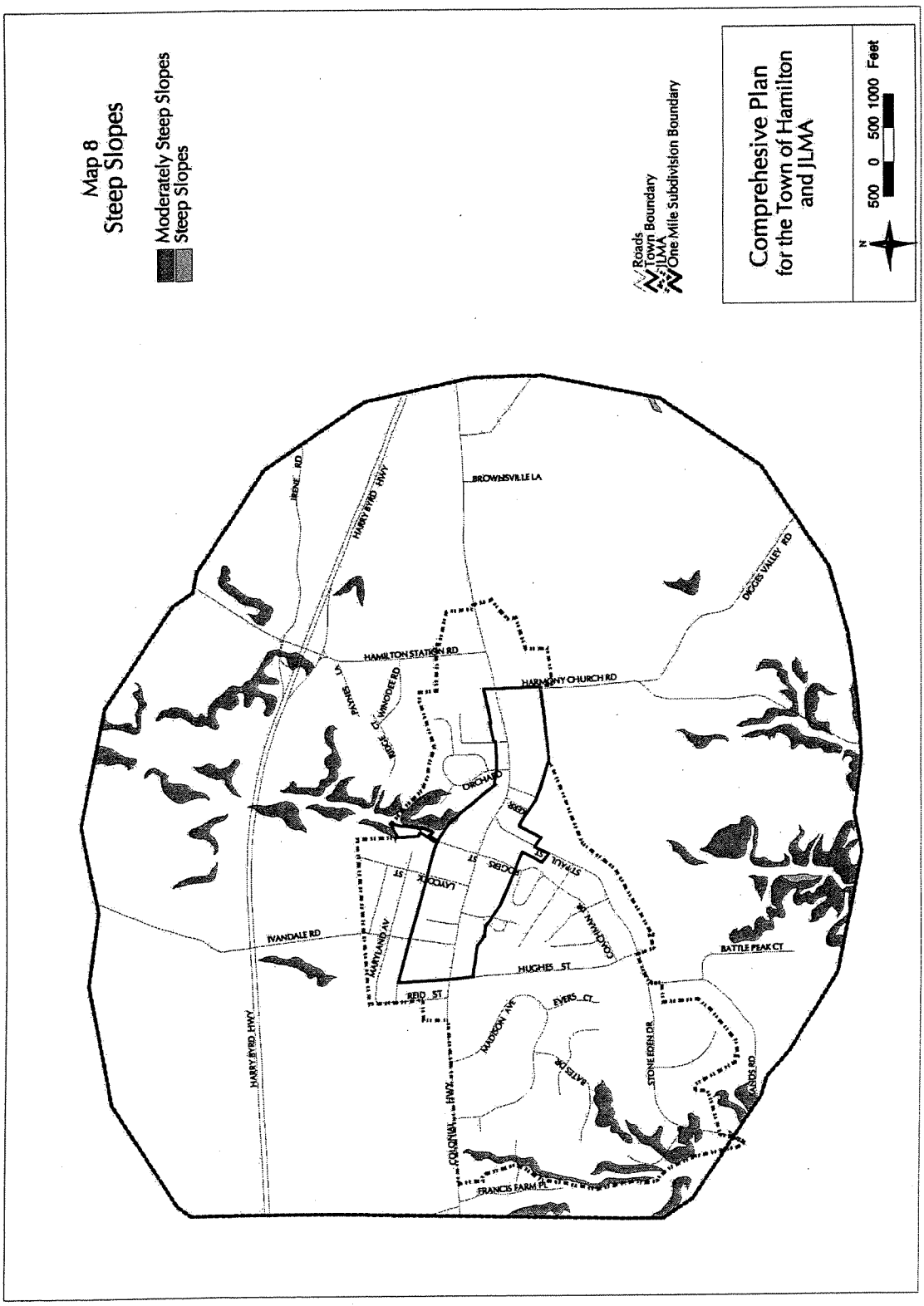
Approximately 40 acres (3%) within the JLMA and no land within the Town constitute the major 100-year floodplain.

Floodplains (both major and minor) offer natural flood storage capacity and locations for recreational facilities and wildlife habitats. Construction in the floodplain can increase the risk of flood damage by reducing the floodplain's storage capacity. For these reasons, regulations govern development on, diversion, or channelization within the 100-year floodplain (major and minor).

Wetlands: About 15 acres of land in the area within the one-mile subdivision boundary contain wetlands, as defined by the National Wetlands Inventory maps of the US Geological Service. These wetland areas are generally closely associated with and often overlap the 100-year floodplain and stream corridors. Wetlands are important natural resources that reduce floodwater peaks by storing the floodwater and reducing velocity. They also serve as groundwater recharge areas, improve water quality, and provide habitat for fish and other wildlife.

Stream Corridors: Several stream corridors run through the Hamilton planning area. They have been relatively undeveloped because of the presence of steep slopes and floodplains.

Wooded stream corridors serve as excellent buffers for filtering impurities in surface runoff moving toward a stream. Steam corridors can contain valuable historic, archaeological, and scenic features. They link developed areas via pedestrian access to extensive open space. These natural areas also provide natural community boundaries. County regulations currently control development by requiring minimum buffers around stream corridors.


Map 8
Steep Slopes
Moderately Steep Slopes
Steep Slopes
Roads
Town Boundary
JLMA
One Mile Subdivision Boundary
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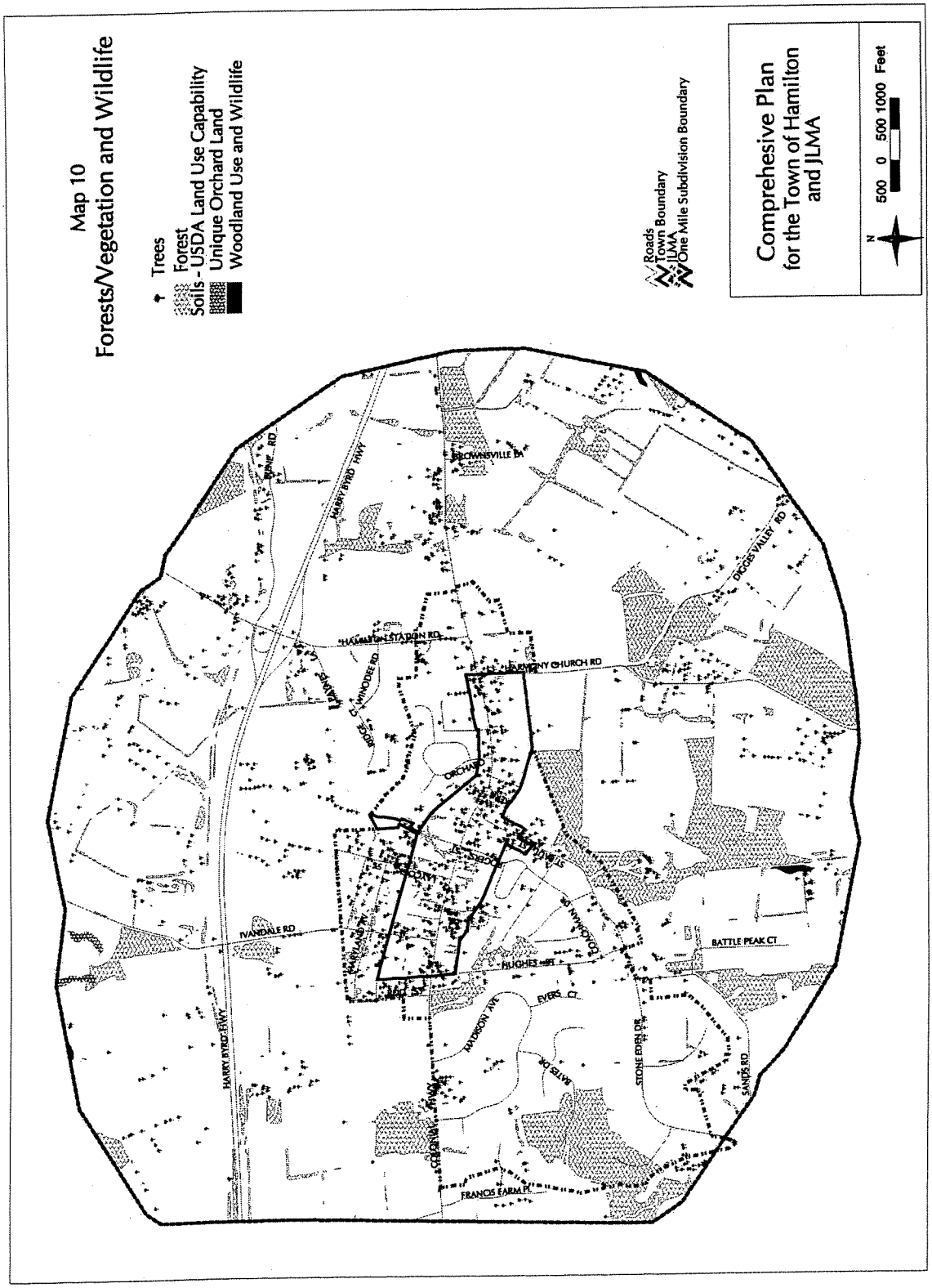
Map 10
Forests/Vegetation and Wildlife
Trees
Forest
Soils - USDA Land Use Capability
Unique Orchard Land
Woodland Use and Wildlife
Roads
Town Boundary
JLMA
One Mile Subdivision Boundary
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IVANDALE RD
BATTLE PEAK CT
HUGHES HILL
EVERS CT
MADISON AVE
STONE BYRN DR
SANDS RD
FRANCIS FARM PL

Forest/Vegetation: Within the Town, thin stands of trees line roadsides and fence lines. Mature trees on individual in-town properties contribute to the natural beauty and the quality of life in the Town.

Slightly more than an acre of land in the Town and about 100 acres within the one-mile subdivision boundary are in woodland. The definition used here is an inclusive one, pertaining to all significant wooded areas that have dense, mature tree cover forming an ecosystem that provides food, water, and shelter for various plant and wildlife habitats.

Forest cover is the ideal land use for maintaining water quality because it generates low levels of pollutants and filters pollutants from both surface and subsurface water flows. Trees also serve as natural habitat for wildlife, are important air cleaners, and contribute to the aesthetic beauty of the area. Mature trees offer much more of these advantages than saplings. Herbaceous cover, especially near natural water collection features, serves many of the same functions.

For these reasons, forests and vegetation should be preserved in stream corridors, wetlands, and floodplains. Where development is proposed, regulations control the preservation of significant tree cover through the maintenance of a minimum percentage of mature tree canopy. Owners of properties with large tree canopies are encouraged to protect them through joining an Agricultural and Forestal District, a County incentive program.

Wildlife: The Hamilton planning area is home to a wide variety of land-and water-based creatures in concentrations on undeveloped land. Red foxes, eastern cottontail rabbits, white-tailed deer, gray squirrels, southern flying squirrels, several bat species, coyotes, mice, snakes, turtles, and salamanders are among the animals that have been identified here. Several species of hawks, owls and other birds make their home here, while a great number of birds pass through during migration.

The presence of wildlife is essential to ecosystem balance. It provides indicators of the health of natural resources and provides enjoyment to human neighbors.

Stream valleys and mountainsides play a key role in preserving wildlife abundance and diversity. A survey documenting rare, threatened or endangered species could help identify and guide the preservation of large-scale wildlife habitats before these areas are sold for residential development.

Environmental Noise, Air Quality, and Light Pollution

Environmental Noise: Highway/traffic noise and construction noise are the main hazards to the local audible environment. The Route 7 Bypass crosses the Hamilton planning area and Business Route 7 runs through the heart of the Town. As active development of surrounding rural lands increases, noise generated by hauling trucks, ground-moving equipment and other construction equipment, both on-site and traversing our roads, will interrupt the valued quiet within the Town and the JLMA.

Noise abatement policies and measures should protect residential communities from these noise hazards.

Air Quality: Because of the rural nature of our surroundings, Hamilton currently has very good air quality. Measures such as maintaining high-quality roads, tree preservation and planting, and natural landscaping will seek to maintain this good air quality. In addition, County policies on residential heat sources (wood burning stoves, fireplaces), open burning, tree planting, mass transit support, as well as vehicle emissions will help us continue to comply with the Federal Clean Air Act (1990).

Light Pollution: Properly designed outdoor lighting can enhance vision, security, safety, utility, and contribute to an attractive nighttime environment. However, adverse effects of poor nighttime lighting include urban sky glow, glare, light trespass, energy waste, and significant harmful impact on local and migrating wildlife.

County and local outdoor lighting zoning ordinances can regulate the placement, orientation, distribution, and fixture type and size of outdoor lighting to encourage lighting that provides safety, utility and security, prevents glare on public roadways, and protects the privacy of adjoining properties.

GOALS – NATURAL RESOURCES

1. Protect the essential functions and integrity of local environmental systems, including surface and groundwater, wetlands, air quality, wildlife habitats and vegetation in an integrated approach as a "green infrastructure" establishing the bounds of development. This green infrastructure must include protection of:

    - Stream corridors as ecosystems that encompass multiple environmental features, thereby protecting water quality and quantity, recharge areas, wildlife habitats, historic resources, and forming continuous open space networks;

    - Wetlands as important natural filters, recharge areas, and wildlife habitat; and

    - Significant trees, tree stands and public open space areas that support the high quality of life in Hamilton.

POLICIES – NATURAL RESOURCES

1. Promote a conservation design approach to development that will promote the preservation of the natural landscape and features and will integrate these elements into the overall design of a development project.

2. Promote awareness and voluntary involvement of local citizens regarding environmental and natural resource issues, problems, needs and opportunities.

3. Control environmental impacts of proposed public and private development within the Town, and the JLMA by reviewing all rezonings, special exceptions, subdivision, and site plan applications to ensure protection of sensitive natural areas.

4. Promote preservation and increase (where possible) open space within the Town and JLMA, by providing guidance and incentives to local landowners/developers to maintain

open space on their lands. These incentives include: land trusts, tax incentives for land conservation, agricultural, forestal and historical districts, open space easements, and the purchase of development rights.

5. Promote a compact and clustered pattern of development around the Town to help preserve important environmental areas such as floodplains, wetlands, steep slopes, and mature woodlands.

6. Identify, designate, and document specific natural features and locations in and around the Town for public open space, such as: bike paths, streambed trails, community gardens, wildlife refuges, old railroad right-of-ways, and historically significant places.

7. Encourage the preservation of the existing fabric and character of the Town, through landscaping, buffering, sidewalks and other improvements to existing and new development.

8. Maintain the level of quiet within the Town.

9. Review the impact of any residential subdivision on the quality or quantity of the Town's groundwater resource.

10. Establish guidelines for, and encourage public and private actions to, maintain and improve local air quality.

11. Establish lighting standards for the prevention of light pollution, in conjunction with the County.

12. Enforce, and refine when necessary, the current Town floodplain protection regulations.

13. Recognize the interdependence of stream corridors and preservation of floodplains, steep slopes, open space, wetlands, wildlife habitat, and scenic vistas and corridors.

14. Recognize and protect the importance of river and stream corridors, and adjacent environmentally sensitive areas, to the overall health of the Town's surface and ground water resources and to its rural character.

15. Promote and encourage participation in community clean up efforts, such as Keep Loudoun Beautiful, by residents and businesses in order to keep stream corridors free of litter and debris.

16. Work to establish overall water quality goals for individual streams and stream segments.

17. Promote water conservation through innovative reuse systems and through informed household use.

18. Encourage recycling by all local residents and businesses.

19. Encourage the protection of local wildlife.

20. Protect vistas through enhanced siting controls and reducing the height of buildings and structures.

ACTION ITEMS - NATURAL RESOURCES

1. The Town will adopt zoning ordinance amendments to establish the design and performance standards necessary to support the conservation design requirements for implementation of the green infrastructure policy.

2. Draft Town zoning ordinance amendments to allow for flexibility in setbacks, lot sizes, and parking requirements to reduce impervious area.

3. The Town will draft zoning ordinance amendments to allow clustering within a site to protect environmentally sensitive areas. Consider alternative design options to promote passive drainage, environmentally sound stormwater management practices, and water quality treatment.

4. Review the Town zoning ordinance to incorporate direction and flexibility to:

    a. Ensure that new subdivisions are not platted in a manner that would necessitate encroachment into the River and Stream Corridor Overlay District (RSCOD);

    b. Provide flexibility within the zoning ordinance (i.e. setbacks, lot dimensions, density transfer, etc.) to accommodate the preservation of the stream corridors;

    c. Allow Facility Standards Manual (FSM) waivers and exceptions, as appropriate; and

    d. Require applicants to provide more detailed information and analysis to facilitate refinement of the overlay boundary.

5. The Town and County will identify public water supply watersheds and develop more stringent performance standards for development in these areas in order to protect surface and groundwater quality. Consider the following actions:

    a. Establishment of a town-wide Resource Management Area in which all development must meet certain performance criteria. Criteria allowed under the Chesapeake Bay Preservation Act include the following:

        - Preventing an increase in nonpoint source pollution from new development based on a jurisdiction-wide average. Reductions are achieved through the use of BMPs (Best Management Profiles).

        - Reducing nonpoint source pollution from redevelopment by at least 10% through the use of BMPs or restoration of open space.

        - Requiring developers to minimize impervious surface cover, minimize land disturbance, and maximize the retention of native vegetative cover.

b. Require pump out of septic systems every five years.

c. Require implementation of a soil and water conservation plan for all agricultural activities.

d. Require compliance with the Department of Forestry's *Best Management Practices Handbook for Forestry Operations* for all silvicultural activities.

e. Actively support volunteer stream monitoring programs that assess and monitor the health of the Town's streams through partnership agreements. Town participation may include support functions, among them such activities as providing funding for testing and monitoring equipment, coordination of volunteer efforts, support of public education and outreach programs, and serving as a central repository for monitoring data so that data can be compiled, integrated into the LOGIS database, and disseminated to the public.

6. The Town will consider ordinance revisions to provide for the protection of surface water resources from the impacts of development with particular focus on sediment loading.

7. The Town will consider participating in the County's wellhead protection program to protect groundwater from contamination and ensure an adequate level of drinking water for the residents. Establish appropriate protection zones around each of the Town's wells.

8. The Town will initiate and maintain a comprehensive pollution management program to protect groundwater and surface water resources.

9. Promote better awareness and voluntary involvement by identifying activities that could be undertaken by local civic organizations and individual citizens to protect and improve the environmental quality within and around the Town, such as:

a. Adoption of open spaces by civic and neighborhood organizations; and

b. Adoption of road segment by local businesses and civic groups, including litter pickup, landscaping, and fundraising for sidewalk repair.

10. Establish a citizens committee of volunteers under a Council Member's chairmanship to:

a. Monitor environmental impacts of development such as tree preservation, stream monitoring and soil erosion management;

b. Promote education of Hamilton area residents about natural features;

c. Identify and implement other natural environment related actions that would implement the goals and policies in this document; and

d. Identify voluntary activities that could be undertaken by local civic organizations and individual citizens to protect and improve the environmental quality within and around the Town.

11. Amend Town ordinances to:

a. Implement a minimum tree-save percentage of 50% for parcels containing mature woodlands; and

b. Incorporate environmental standards for new development, including measures such as stream buffers, limits on clearing and grading on moderately steep slopes, preservation of existing tree stands, clustering to preserve open space, and noise and light pollution standards.

12. Assist local landowners/developers to maintain open space, identify and designate specific natural features and locations in and around the Town for public open space. Suggested means include: bike paths, stream bed trails, community gardens, wildlife refuges, old railroad right-of-ways, historically significant places, etc.

13. Establish a compact and clustered pattern of development in the JLMA to help preserve important environmental areas such as steep slopes, floodplains, wetlands and mature woodlands.

14. Work with the County to develop and promote rural open space preservation alternatives to dense residential development of currently open land in the JLMA and the area subject to the one-mile subdivision authority of Hamilton. Alternatives for open space preservation may include land trusts, tax incentives for land conservation, agricultural, forest and historical districts, open space easements, and the purchase of development rights.

15. Review and amend, as appropriate, the current Town land development regulations to ensure adequate provision for erosion control and storm water management. Promote design alternatives to:

a. Preserve open space and natural resources;

b. Minimize the creation of new impervious area; and

c. Minimize increases in post-development runoff peak rate, frequency and volume.

16. Establish guidelines that will help to maintain and improve local air quality.

17. Amend the Town subdivision ordinance and require hydrological study prior to submission of development/zoning applications.

18. The Town and County will initiate study to locate underground fuel tanks and institute plans for removal.

19. The Town will establish a strategic Land Preservation Plan that prioritizes the acquisition of privately held parcels, emphasizing those threatened with the greatest building potential but which have significant conservation values.

20. The Town and County will conduct a survey to document rare, threatened or endangered species in Hamilton and the JLMA.